11.1 Evidence for Evolution

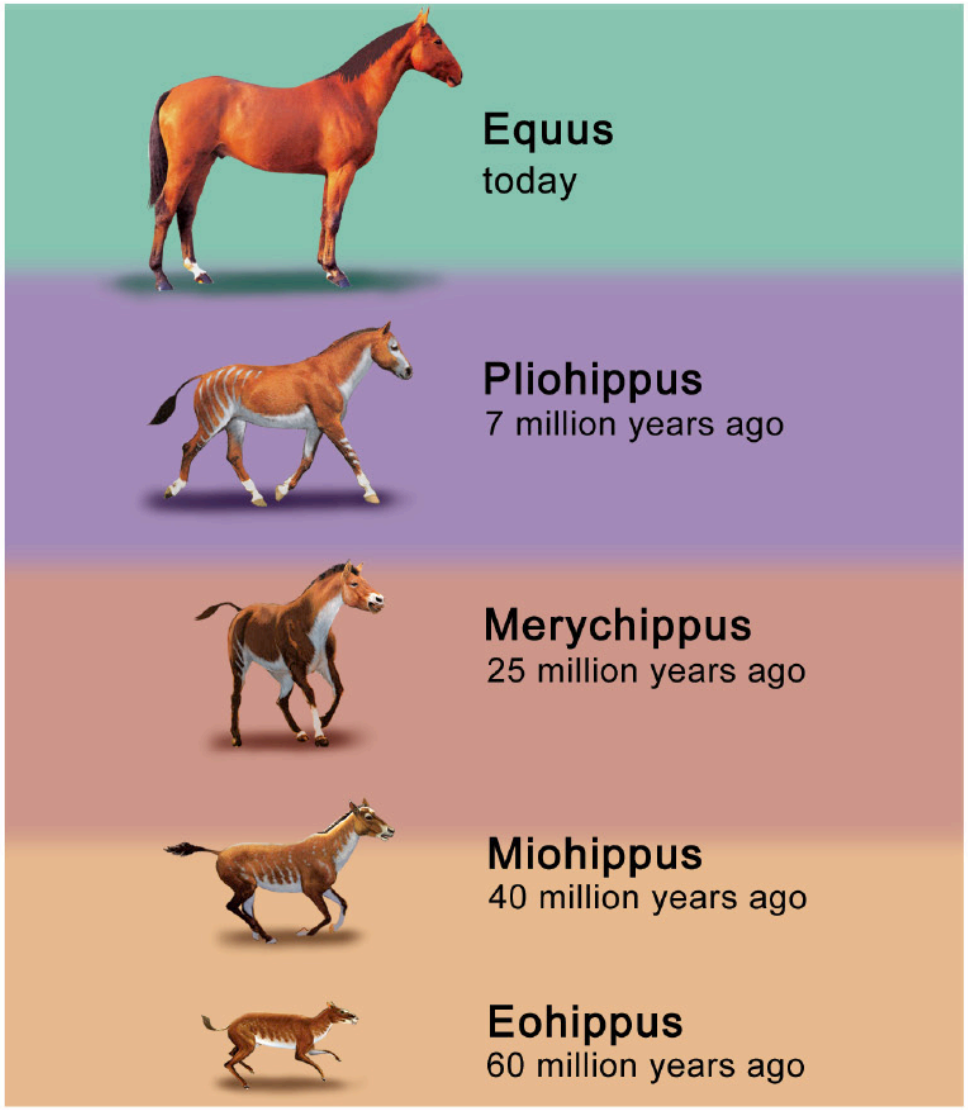
- An **adaptation** is an inherited trait that helps an organism survive.
- Adaptations include body structures that help an organism feed, move around, and protect itself.

11.1 Evidence for Evolution

- **Evolution** is the process of how organisms acquire adaptations over time.

Eohippus is an ancestor of what modern animal?

Horse Evolution

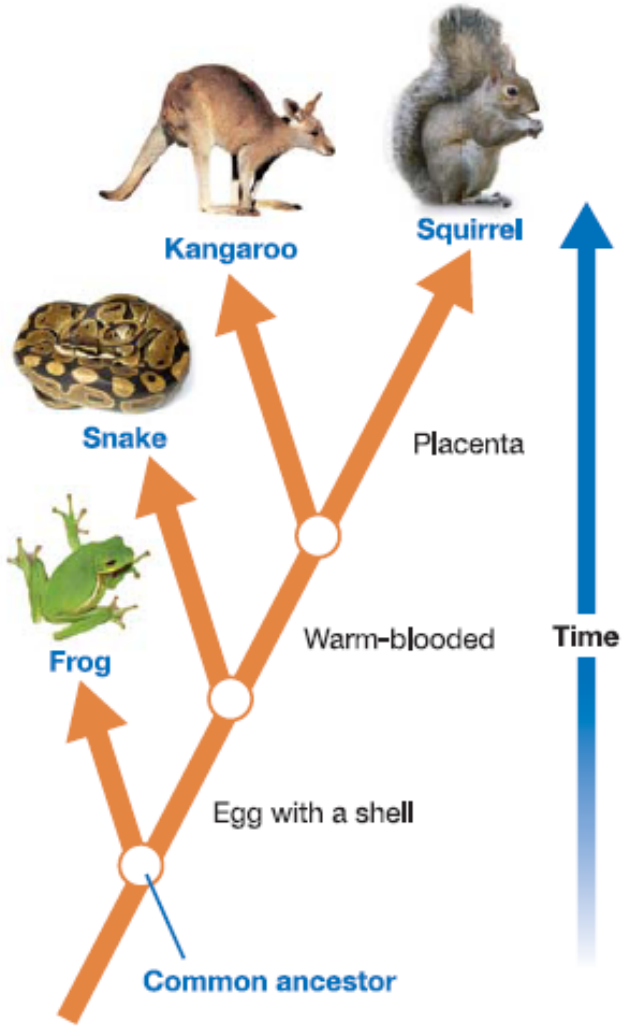


11.1 Evolution is a branching process

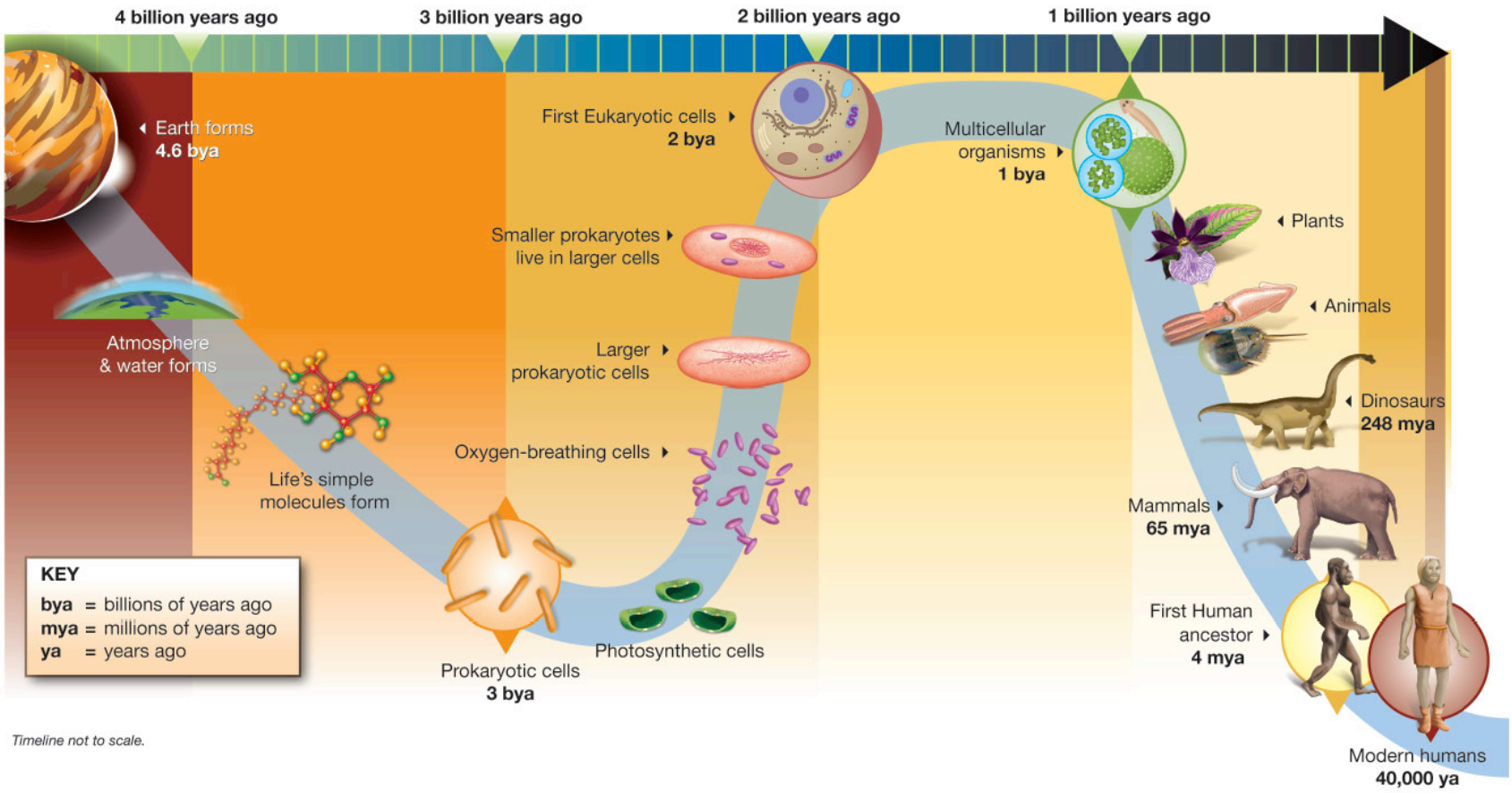
- *Diversity* means variety.
- Scientists hypothesize that all life forms evolved from a common ancestor and new species branch off from earlier species.
- Similarities among all cells support the hypothesis that all life evolved from a common ancestor.
  - All cells have a similar cell membrane.
  - Many cells have the same type of cellular respiration.
  - All cells have DNA as their hereditary material.

11.1 Evolution is a branching process

- An **ancestor** is an organism from which others have descended.
- A **cladogram** displays evolutionary relationships among living species and their ancestors.

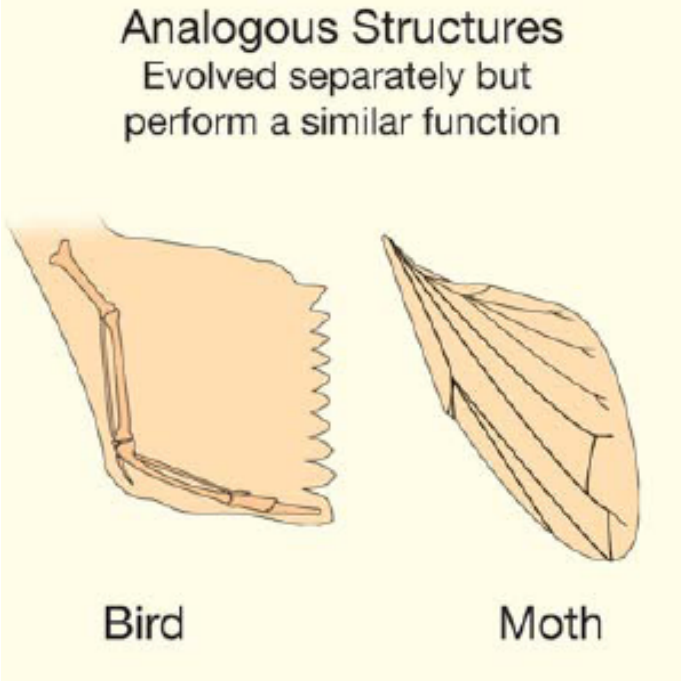


Life Timeline



Timeline not to scale.

11.1 Lines of Evidence



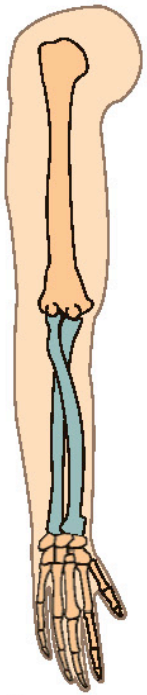
- **Many lines of evidence provide the basis for the theory of evolution. These include:**
  - **comparative anatomy**
  - **DNA analysis**
  - **fossil record**

11.1 Lines of Evidence

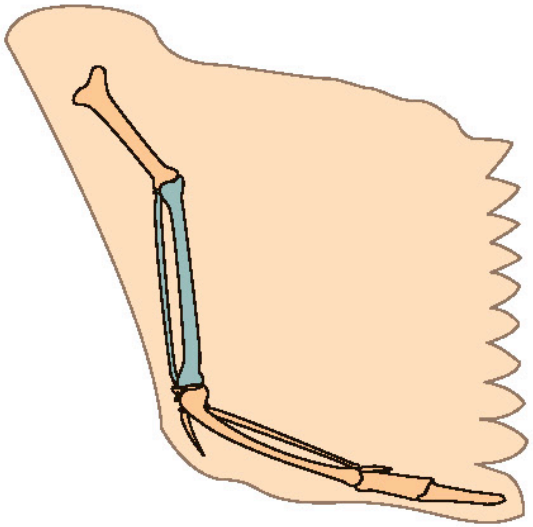
- **Comparative anatomy** is the study of anatomical similarities and differences among species.
- What does your arm have in common with the wing of a bird, the flipper of a porpoise, and the forelimb of an elephant?
- **Analogous structures** serve the same function but come from different origins.
- **Homologous structures** have a common origin, but do not necessarily perform the same function.

Homologous Structures

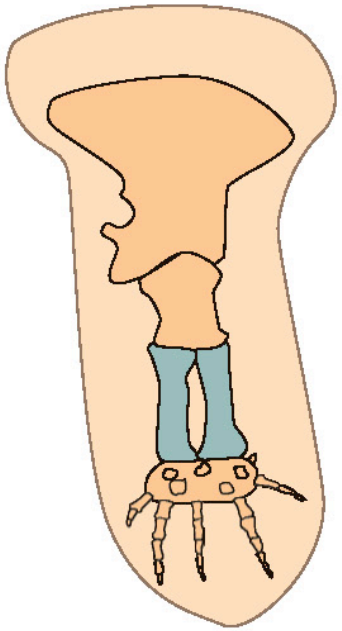
Suggest evolution from a common ancestor



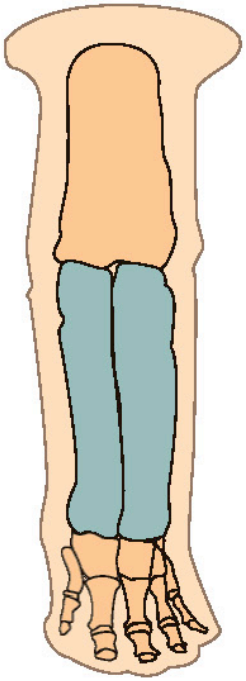
Human



Bird

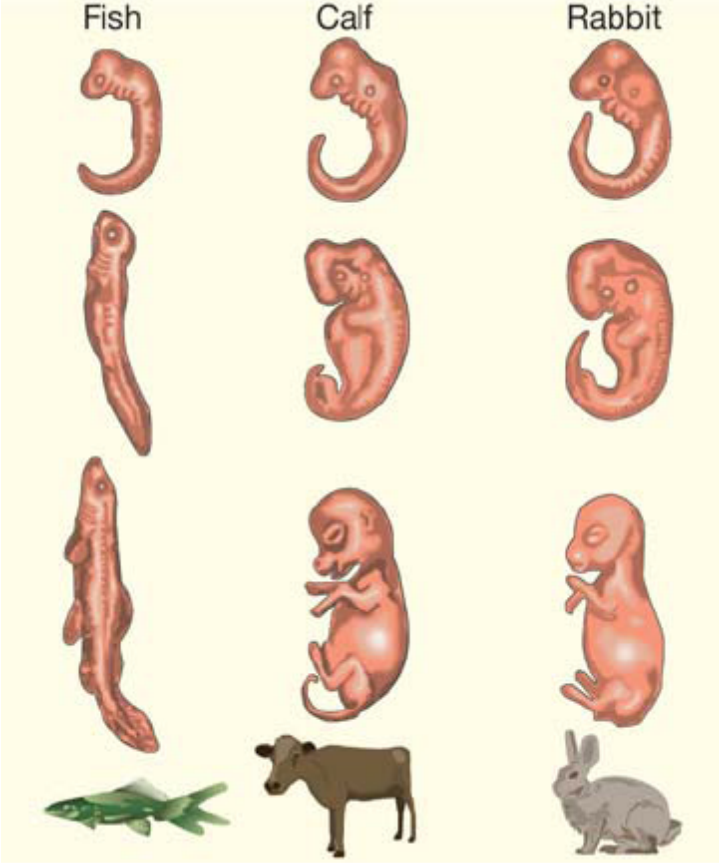


Porpoise



Elephant

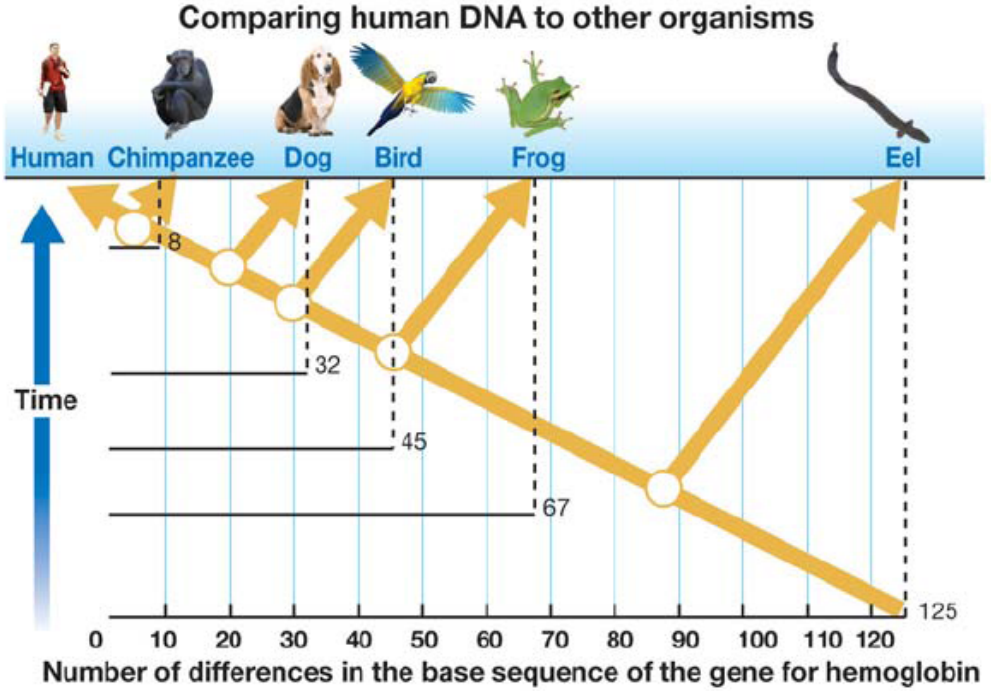
11.1 Lines of Evidence



- **Vertebrates** are animals with a backbone.
- Comparative anatomists have discovered similarities in embryos of vertebrates.
- Adult vertebrates also share many similarities in their skeletons and muscles.

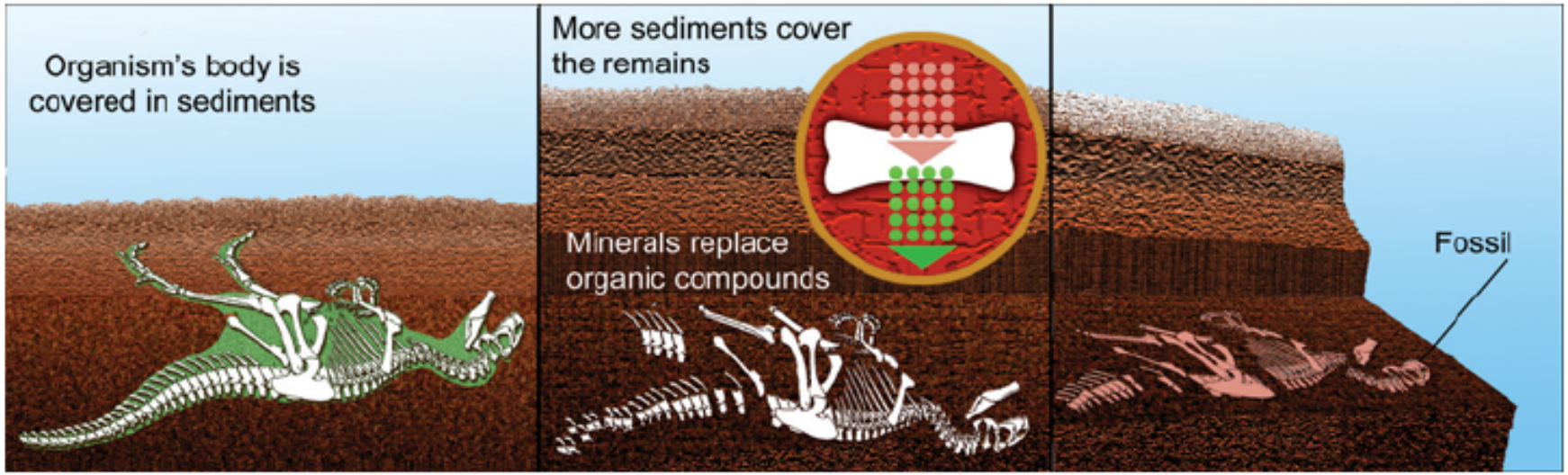
11.1 Lines of Evidence

- Species that share more similarities in their DNA base sequences are more closely related than those that share fewer similarities.



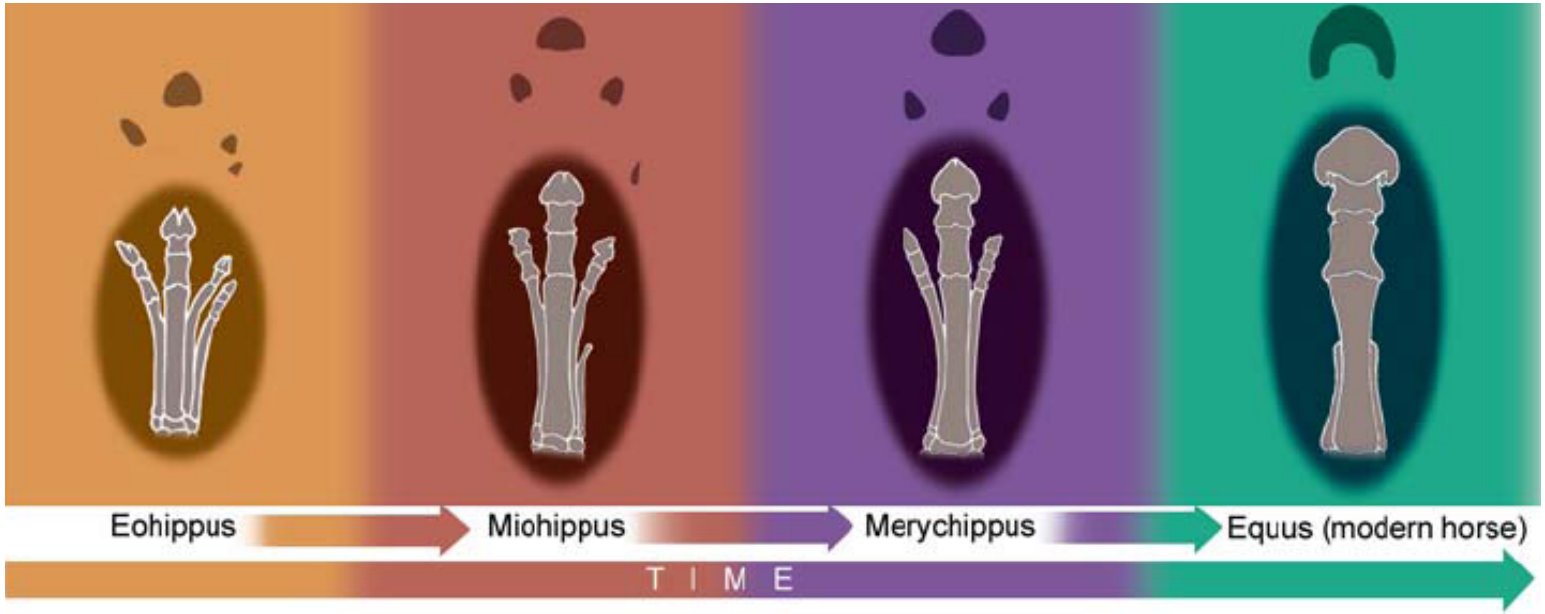
11.1 Fossils

- A **fossil** is a remnant or trace of an organism from the past, such as a skeleton or leaf imprint, embedded and preserved in Earth's crust.



11.1 Fossil Record

- Fossils found in the upper (newer) sedimentary layers more closely resemble present-day organisms than fossils found in deeper (older) layers.



Ecology Connection

Chameleon of the Sea

- All animals try to blend into their surroundings. Some are nearly perfect at it.